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On issues for RRM specification quality improvement

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Background

- RAN4#110-bis approved an WF (R4-2406710) for RAN4 spec quality improvement
- Following are agreed related to identification of issues to be handled

> - Agreement:
> - In RAN4#111, it should be prioritized to identify the issues for RRM spec improvement, which are feasible to be addressed within R19 timeframe
> - Interested companies are encouraged to provide their inputs and analysis.
> - Based on the discussion in RAN4#110bis, the following editorial aspects can be further discussed if and how to be addressed within R19 timeframe.
> - Terminology/style inconsistency, incorrect notation/symbols/abbreviation, undefined abbreviations, redundant information/notes
> - In the main and Annex parts: Clean up [], ‘TBD’, ‘FFS’, empty test cases
> - Others are not precluded

- In this paper, we provide our views on issues that need be addressed in R19 timeframe.

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Editorial issues

- Proposal 1: Identify editorial issues and make correction in R19 timeframe
  - Most practical improvement in R19 timeframe
  - Will set up a reference for 6G specs
- Proposal 2: Setup the list of issues to be addressed
  - Alignment of terminology, notation, symbols and abbreviation
  - Correct use of styles and indentations
- Proposal 3: Setup the time line and work split for the correction
  - Suggest to complete the work in Q3 and Q4 for core part, FFS for perf part
  - Suggest to distribute the work load based on proper work split, e.g. based on clauses or types of issues

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Non-editorial issues

- Proposal 4: Consider to address the following non-editorial issues in R19 timeframe
  - Duplication: same or similar requirements defined in different formats or wording in multiple places across the spec
  - Discrepancy: different approaches for adding requirements or test cases for new feature, extending existing clauses, creating new clauses with full requirements or creating new clauses with a reference to existing clauses
- Proposal 5: Avoid technical discussions when addressing non-editorial issues

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Annex: examples of duplication in 38133

The intra-frequency measurement requirements in clause 9.2.5 applies for the following scenarios:

- SSB based intra-frequency measurements with no measurement gap,
  - for a UE supporting concurrent gaps and when concurrent gaps are configured:
    - When none of the SMTC occasions of this intra-frequency measurement object are overlapped by the union of concurrent measurement gaps.
    - When part of the SMTC occasions of this intra-frequency measurement object are overlapped by the union of concurrent measurement gaps.
  - otherwise, for a UE not supporting concurrent gaps or if concurrent gaps are not configured:
    - When none of the SMTC occasions of this intra-frequency measurement object are overlapped by the measurement gap.
    - When part of the SMTC occasions of this intra-frequency measurement object are overlapped by the measurement gap.
  - SSB based intra-frequency measurements object with no measurement gap for UE capable of [*NeedForInterruptionNR-r18*],

9.1.5.1 Monitoring of multiple layers outside gaps

For a UE supporting concurrent gaps or [concurrent gaps with Pre-MG] or [concurrent gaps with NCSG], and when concurrent [gaps] are configured the carrier-specific scaling factor $CSSF_{outside_gap,i}$ for measurement object *i* derived in this chapter is applied to following measurement types :

- SSB-based intra-frequency measurement with no measurement gap in clause 9.2.5 and 9.2A.5, when none of the SMTC occasions of this intra-frequency measurement object are overlapped by the union of concurrent [GAPs].
- SSB-based intra-frequency measurement with no measurement gap in clause 9.2.5 and 9.2A.5, when part of the SMTC occasions of this intra-frequency measurement object are overlapped by the union of concurrent [GAPs].
- CSI-RS based intra-frequency measurement in clause 9.10.2, when none of CSI-RS resources for L3 measurement of this intra-frequency measurement object are overlapped by the union of concurrent [GAPs].
- CSI-RS based intra-frequency measurement in clause 9.10.2, when all CSI-RS resources for L3 measurement of this intra-frequency measurement object are partially overlapped by the union of concurrent [GAPs].
- SSB-based inter-frequency measurement with no measurement gap in clause 9.3.9, when none of the SMTC occasions of this inter-frequency measurement object are overlapped by the union of concurrent [GAPs], if UE supports *interFrequencyMeas-NoGap-r16* and the flag *interFrequencyConfig-NoGap-r16* is configured by the Network.
- SSB-based inter-frequency measurement with no measurement gap in clause 9.3.9, when part of the SMTC occasions of this inter-frequency measurement object are overlapped by the union of concurrent [GAPs], if UE supports *interFrequencyMeas-NoGap-r16* and the flag *interFrequencyConfig-NoGap-r16* is configured by the Network.

- Duplication:
  - > Defining whether a measurements should be taken within or outside MG requires complex requirements, and same requirements are defined in both delay part (9.2.1/9.3.1) and CSSF part (9.1.5) in different wording (above figures)
  - > There are two formats for the definition of Kp for L3 measurement and P factor for L1 measurement, and they leads to the same technical outcome.

This duplication can be avoided if more time is allowed to review and discuss the CRs before they have to be agreed to complete WI on time.

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Annex: examples of discrepancy in 38133

- Discrepancy:
  - > same feature: RedCap positioning in INACTIVE
  - > different measurements: RSTD and Rx-Tx
  - > one clause includes the full requirements, the other clause includes a reference to non-RedCap requirements with full set of applicability conditions

This discrepancy can be avoided if there was alignment among companies how to add requirements for this new feature

5.6A.4.5 Measurement period requirement without FH

After receiving both *NR-DL-TDOA-ProvideAssistanceData* message and *NR-DL-TDOA-RequestLocationInformation* message from the LMF via LPP [34], the UE shall be able to measure multiple (up to the UE capability specified in Clause 5.6A.4.3) DL RSTD measurements, defined in TS 38.215 [4], during the measurement period $T_{RSTD,Total}$ defined as:

$$T_{RSTD,Total} = \sum_{i=1}^{L} T_{RSTD,i} + (L-1) \times \max(T_{effect,i})$$

Where:

- i is the index of positioning frequency layer,
- L is total number of positioning frequency layers, and
- $T_{effect,i}$ is the periodicity of the PRS RSTD measurement in positioning frequency layer i

$T_{RSTD,i}$ is the measurement period for PRS RSTD measurement in positioning frequency layer i as specified below:

$$T_{RSTD,i} = \left(K_{carrier_PRS_RedCap} \times N_{Rx,TEG,i} \times N_{RxBeam,i} \times \left\lceil \frac{N_{PRS,i}^{slot}}{N'} \right\rceil \times \left\lceil \frac{L_{available_PRS,i}}{N} \right\rceil \times N_{sample} - 1\right) \times T_{effect,i} + T_{last,i}$$

5.6A.6.5 Measurement Period Requirements without FH

When physical layer receives last of *NR-Multi-RTT-ProvideAssistanceData* message and *NR-Multi-RTT-RequestLocationInformation* message from LMF via LPP [34], UE shall be able to measure multiple (up to the UE capability specified in clause 5.6.4.3) UE Rx-Tx time difference measurements as defined in TS 38.215 [4] in configured positioning frequency layers within the measurement period $T_{UERxTx,Total}$ ms defined in 5.6.4.5.

If the RRC state transion occurs from RRC_INACTIVE to RRC_CONNECTED state during the UE Rx-Tx time difference measurement period then the UE shall restart the UE Rx-Tx time difference measurement after it obtains SRS configuration and Timing Advance command from the serving cell.

If cell reselection occurs during the UE Rx-Tx time difference measurement period then the UE shall restart the UE Rx-Tx time difference measurement after it obtains SRS configuration and Timing Advance command from the new serving cell.

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